Revisional Notes on the Tribe Brachyrrhopalini (Robber Flies), with Remarks on Habits and Mimicry.

By G. H. Hardy,

Walter and Eliza Hall Fellow in Economic Biology, Queensland University, Brisbane.

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The genus *Brachyrrhopala* was proposed for a single species in 1847, namely *B. ruficornis* Macquart, the leading diagnosis being the short clubbed character of the abdomen, this narrowing to the apex of the second segment, widening from there and being rounded at the apex of the abdomen.

Roder recognised the genus and widened it by placing thereunder other but unrelated forms with clubbed abdomen. He described *B. victoriæ* and *B. maculata,* also he placed *Dasypogon maculinervis* Macquart there.

Ricardo followed Roder's arrangement, describing *B. fulvus,* but suggested *Codula quadricinctus* Bigot was identical. She also included *Codula fenestrata* Macquart, referring *B. victoriæ* as a synonym of it. In addition she placed *Dasypogon limbipennis* Macquart under the genus, but erroneously regarded *Dasypogon maculinervis* Macquart as a synonym of it. She further confused the genus by including *Dasypogon nitidus* Macquart.

White subsequently followed Ricardo, adding *Brachyrrhopala bella.* Up to this time the only criticism of the position was given by White:—"*B. fenestrata* differs so much from *B. nitidus* and *B. limbipennis* in the shape of the abdomen and much shorter wings that it might well be made the type of a new genus. It seems to be nearly allied to the genus *Codula,* but differs in having a curved terminal spine on the anterior tibiæ; this character, however, in some specimens is difficult to make out, and I am somewhat doubtful of its value as a generic character" (White 1916, p. 158).

White did not recognise the typical form of *Brachyrrhopala,* and had he done so he most certainly would have reversed his suggestion so as to place *B. nitidus* and *B. limbipennis* elsewhere. White's implied suggestion that *Codula* and *Brachyrrhopala* should be treated as one genus has also been suggested to me from another source, and it is one that I think would commend itself to many Dipterists, only there are augmentary characters subsequently given for the former genus that would prohibit this arrangement.

In the meanwhile *Codula limbipennis* remained uncertainly recognised, but its identity is now fairly well assured, so relationship between these genera can be cleared up as well as the identity of the species described under them. The disposition of species hitherto placed under these genera is as follows:—

Codula limbipennis Macquart is the genotype of *Codula* by original designation.

Codula vespiformis Thomson is a synonym of *C. limbipennis.*

Brachyrrhopala ruficornis Macquart is the genotype of *Brachyrrhopala* by original designation.

Codula fenestrata Macquart belongs to *Brachyrrhopala.*

Brachyrrhopala victoriæ Roder is regarded as a synonym of *B. fenestrata.*

Codula quadricinctus Bigot is a *Brachyrrhopala.*

Brachyrrhopala fulva Ricardo is a synonym of *B. quadricinctus.*

Recently I added *Cabasa* Walker as a synonym of *Brachyrrhopala,* thus bringing in four further specific names representing one valid species *Dasypogon pulchella* Macquart.

Dasypogon maculinervis Macquart is an *Erythropogon* White.

Dasypogon limbipennis Macquart is another *Erythropogon.*

Dasypogon nitidus Macquart is a *Neosaropogon.*

Brachyrrhopala bella White is near *Saropogon.*

Brachyrrhopala maculata Roder has not been recognised, but judging from the description is certainly not of that genus; compare with the descriptions of *Dasypogon sergius* and *D. fenestans* Walker, both placed by Ricardo in *Saropogon,* but more certainly belonging to *Neosaropogon.*

The genus *Cabasa* may be ranked as of subgeneric value on certain characters given in the key below. Other generic relationships in this tribe are clearly indicated in literature and need no special comment here.

Key to the Genera of the Brachyrrhopalini.

1. Thorax provided with a pair of lateral spines, one placed on each side immediately above the insertion of the wings. Moustache limited to the oral margin or practically so. Female with the ovipositor strongly compressed .. .. 2.

   Thorax without such spines, gibbous. Moustache usually extending above the oral margin, being represented there by soft hairs on the lower part of the face. Female with ovipositor not of the compressed type .. .. *Brachyrrhopala* 4.

2. Antennæ provided with four readily discernible segments and a minute apical spine .. .. .. *Chrysopogon* Roder.

   Antennæ with only three segments and a spine; at most the fourth segment is vestigial, the line of demarcation between it and the third being just visible .. .. 3.

3. Spine at apex of the third segment of antennæ large and conical. Abdomen with seven segments always visible. Tibial spur present .. .. .. *Opseostlongis* White.

Spine on third segment of antennæ minute. Abdomen with only six visible segments. Tibial spur absent. Thorax rather gibbous .. .. .. *Codula* Macquart.

4. Abdomen narrowest at the base of the second segment and always with eight visible segments. Moustache confined to the oral margin, or at most with a few hairs immediately above it. Black species with a highly gibbous bright-red thorax .. Subgenus *Cabasa* Walker.

Abdomen narrowest at the apex of the second segment. Face with many soft hairs extending well above the bristly ones on the oral margin. Thorax usually black and less gibbous .. Subgenus *Brachyrrhopala* Macquart.

Genus CODULA Macquart.

Macquart 1849, 70; Ricardo 1912, 149; Hardy 1921, 292.

This genus is sufficiently well diagnosed for recognition in the key given above, but it may be here added that the second segment of the abdomen is uniformly wide throughout and somewhat stouter than that in the genus *Brachyrrhopala*. I have not detected the seventh segment of the abdomen on the female when the ovipositor is exserted, and so suggest that this segment may ultimately be found reduced and absorbed by the very compressed ovipositor. Though resembling *Brachyrrhopala* in many respects, this genus shows in most of its characters that the affinities are nearer to *Chrysopogon*.

Codula limbipennis Macquart.

?*Asilus conopsoides* Fabricius 1775, p. 795; ?*Dioctria conopsoides* Fabricius 1805, 151; Kertesz Cat. Dipt. 1909, 106 (which see for full references under these names).

Codula limbipennis Macquart 1849, 70, Pl. 7, fig. 1; Ricardo 1912, 149.

Codula vespiformis Thomson 1869, 464; Ricardo 1912, 150; Nicholson 1927, Pl. 1, fig. 3.

Synonymy.—Although there are many references to *Asilus* (*Dioctria*) *conopsoides* Fab., at most all are copies of the original description. None of the subsequent authors seem to have recognised the species, and Ricardo proposed to "expunge the name" as she considered it was impossible to ascertain the genus. The original description, however, fits the present species remarkably well, and the form is sufficiently *Conops*-like to be worthy of the name. It is certainly common enough to have been taken by Banks, and the only criticism I have to offer is that I have no record of its occurrence during the month when Banks visited these shores.

There can be little doubt concerning the remainder of the above synonymy and I have seen a sufficiently long series to be reasonably convinced that the various descriptions can apply to but one species, whilst Macquart's description and Ricardo's notes on the type conform to it.

Description.—The female has not hitherto been described; it conforms to the male in characters. The antennæ are not quite as in the *Brachyrrhopala*, for the fourth segment is still traceable, and they do not conform to those found in the genus *Chrysopogon*.

Habitat.—Queensland, New South Wales, and probably Victoria. The allotype female and a series of paratype females are in the Queensland Museum; other paratypes are in the collection of Mr. J. Mann.

Genus BRACHYRRHOPALA Macquart.

Macquart 1847, 36; Ricardo 1912, 486; White 1916, 156, and 1918, 74; Hardy 1921, 292, and 1926, 307, fig. 1.

Cabasa Walker 1850, 100; Ricardo 1912, 479; White 1916, 155; Hardy 1921, 291.

The genus *Cabasa* was previously placed as a synonym by me, and although some differences have since been discovered that would separate the form from *Brachyrrhopala*, these do not seem to be more than of subgeneric value. Three forms retained here as being of specific value may ultimately prove to be but one widely varying species, or two at the most. *B. ruficornis*, *B. fenestrata*, and *B. quadricincta* appear to be identical in structure, but there is another species as yet to be described that has the antennæ twice as long as on these, the legs are unicolorous and the wings lightly suffused with brown throughout. This undescribed form suggests that structures are not so consistent as hitherto thought to be, but that structures are not to be entirely relied upon as a criterion for species in this genus is seen by the new form here described. In this case we have a quite distinctive species that seems to conform to the *ruficornis* group in all its general structures. On this account I am leaving the status of the species in the *ruficornis* group unaltered, making the reservation that the status of two species is not quite satisfactory.

There is a new genus that is a member of the *Saropogonini*, but has a superficial appearance of the genus *Brachyrrhopala*. To this new genus I believe *B. bella* White comes. It is noteworthy in so far as a true moustache is not formed; instead it has long, soft, scattered hairs, disposed very much in the same way as the similar hairs of the thorax, none occurring on the oral margin. It is some years now since I last examined White's species and I made no detailed notes of that form at the time, but its description does not conform to the species before me.

Key to the species of the genus Brachyrrhopala.

1. A black species with a strongly gibbous red thorax, containing black markings. Wings varying from completely black to semi-hyaline. Abdomen varying slightly, either completely black, or metallic blue-black, or else with a white spot on the second segment; the sclerites are rather soft .. .. *pulchella* Macquart.

Black, black and red, or black and yellow species, usually with some of the abdominal segments margined with red or yellow. Thorax never vivid red, at most obscurely red; less gibbous. Abdomen with hard rigid sclerites .. .. 2.

2. A black species with the dorsal area of the abdominal segments 4 to 6 completely reddish yellow (vivid red when alive). Wings almost completely brown. Antennæ, all knees, and posterior tarsi reddish yellow; the intermediate tibiæ may also be reddish .. .. *semirufa* n.sp.

Wings only partly suffused with brown, all legs partly red, abdomen banded with black and yellow or red .. .. .. 3.

3. Yellow on abdomen restricted to a narrow band at the apex of the second, third, and sixth segments. Wings infuscated across the base of the median cell, this marking runs to the base along the radial and cubital veins .. .. *ruficornis* Macquart.

Markings on abdomen not so limited .. .. 4.

4. Yellow on abdomen restricted to a band at the apex of the second, third, fifth, and sixth segments. Wings infuscated over most of the area, but leaving hyaline areas, conspicuously so in the basal and median cells. Face entirely black (or whitish at sides according to other authors) .. *fenestralis* Macquart.

Apex of most abdominal segments yellow, or this colour may extend over the whole of certain segments, and at least the second abdominal segment is mainly yellow. Wing markings vary from approaching that of *fenestralis* to that of *ruficornis*. Face yellow at sides .. .. .. *quadricinctus* Bigot.

Brachyrrhopala pulchella Macquart.

Dasypogon pulchella Macquart 1846, 62, Pl. 7, fig. 9.
Cabasa pulchella Hardy 1920, 185 (which see for synonymy and references).
Brachyrrhopala pulchella Hardy 1926, 307; 1927, 394; Nicholson 1927, Pl. 1, fig. 35.

There would appear to be one very variable species incorporated in the synonymy, and no published characters are found sufficient to distinguish lines of demarcation between these forms when long series are examined. A well-known but unpublished variation is described under a new name in the Gibbons manuscript and labelled in his collection; it has a white mark on the second segment of the abdomen. Even this character varies, the mark ranging from a small dot to occupying practically the whole of the dorsal area of the second segment; on old specimens this spot becomes obscure and difficult to detect. The species ranges from Tasmania to Queensland, but I have never seen a specimen from the former State having that white mark.

Brachyrrhopala ruficornis Macquart.

Macquart 1847, 36, Pl. 1, fig. 7; Walker 1854, 494; Roder 1883, 273; Ricardo 1912, 586; White 1916, 158; Hardy 1918, 66, and 1927, 394 (nec Froggatt 1907).

The female of this species was described from Tasmania, and the one specimen before me, a male, agrees remarkably well with the description. The sex was queried by Macquart, but it was undoubtedly given correctly as the male organs are always visible on specimens of this genus. The form was first rediscovered in the Littler collection in 1917, and the one before me is the only other specimen I have seen.

It differs from Tasmanian specimens of *fenestralis* chiefly in the wing marks, but also in the colour on the apical margin of the fifth abdominal segment. No intermediate forms have been seen from that State. Froggatt's record from Queensland is referable to *B. quadricinctus* Bigot, if indeed these forms are distinct.

Habitat.—Tasmania: Hobart, January, 1924, 1 male allotype.

Brachyrrhopala fenestrata Macquart.

Codula fenestrata Macquart 1849, 79, Pl. 7, fig. 2.
Brachyrrhopala fenestrata Ricardo 1912, 586; White 1916, 157.
Brachyrrhopala victoriæ Roder 1892, 241.

Originally described as from Tasmania, there is some doubt concerning the correctness of this type locality. My identification is based entirely on Tasmanian material, following White, but Ricardo recognised it from Victoria, and her redescription of the type certainly conforms to Tasmanian material more than to any known to me from the mainland. Many mainland specimens of Asilidæ, especially Queensland ones, are much lighter in colour than representatives of the same species from Tasmania, and Mr. H. Hacker, of the Queensland Museum, informs me he has noted similar lighter tones apply to certain Homoptera. Possibly in Victoria specimens are to be found that will complete the series of variations between the present species and *B. quadricinctus*.

Habitat.—Tasmania: Hobart, 24th January, 1915; Dunally, 21st February, 1918; Wynyard, February 1924. All three are females. The Wynyard specimen was one of several seen resting high up telegraph poles, and was difficult to catch.

Brachyrrhopala quadricincta Bigot.

?*Dasypogon nigrinus* Macquart 1849, 66; Ricardo 1912, 351.
Codula quadricincta Bigot 1878, 442; Ricardo 1912, 588.
Brachyrrhopala fulva Ricardo 1912, 588; Hardy 1927, 394.
Brachyrrhopala ruficornis Froggatt 1907, 300: (nec Macquart).
Brachyrrhopala fenestrata Nicholson 1927, text-fig. 3A and Pl. 1, fig. 24.

The type of *Dasypogon nigrinis* Macquart is a male in the Paris Museum, and it was examined by Ricardo, who states, "but the short antennæ seem to preclude it from belonging to the genus *Brachyrrhopala* or *Codula.*" Also she referred to the third segment of the antennæ as being "conical, about as long as the first two together." The length at least, as given by her in this manner, suggests *Brachyrrhopala* rather than otherwise. Fifth and sixth segments with testaceous margins, and the seventh testaceous, certainly conforms to the abdomen in this genus, as also other characters mentioned. The type locality is Tasmania, but as the description occurred in the fourth supplement probably Sydney is the true locality. I think the species may refer to the same as that known on the mainland as *B. fenestrata*, and not necessarily the same as that known under the name from Tasmania.

There can be little doubt concerning the correctness of the other references given above, part of which was suggested by Ricardo. The descriptions are referable to a very variable Queensland species that has the second abdominal segment entirely yellow or almost so. Even when very dark, and having the wing pattern similar to that of *B. fenestrata,* this is the case. The question now arises as to whether New South Wales and Victorian specimens named *fenestrata* in collections are not *quadricincta* Bigot, also it is pertinent to remark that if the colour of the second abdominal segment is not consistent, as it appears to be from a series of Queensland specimens, then there are no known characters to distinguish between *fenestrata* and *quadricincta* as here recognised. As far as I know them at present, geographical distribution, allied with colour characters, suggests that the two may hold good in their specific status.

Habitat.—Queensland: Brisbane and Stradbroke Island, September to February. New South Wales: Richmond River, October, 1 male.

Brachyrrhopala semirufa n. sp.

A very distinct species that can scarcely be confused with those referred to above. The head, thorax, anterior and intermediate femora except the knees, posterior femora except apex, the first two abdominal segments above and the whole area below, are all black. The remaining segments of the abdomen, when alive, are vivid red above, but on dried specimens fade to reddish yellow. The apices of all femora are reddish, as also the posterior tibiæ and tarsi. On one specimen the intermediate tibiæ are also reddish. As usual with species of this genus, the antennæ are reddish and the face is covered with yellow tomentum bordering the eyes, leaving a shining black central stripe. The wings are almost entirely suffused with brown, more anteriorly so along the veins; the membrane of the wing tends to become hyaline only near the posterior margin.

Length.—12 mm.

Habitat.—Queensland: Brisbane, the holotype, a male, September 1928; two paratype males, Brisbane and Stradbroke Island, December 1912. The two last are in the Queensland Museum and were taken by Mr. H. Hacker.

Genus CHRYSOPOGON Roder.

Roder 1881, 213; 1892, 234; Ricardo 1912, 481; White 1917, 72; Hardy 1921, 288; Malloch 1928, 300.

This genus would seem to come between *Opseostlengis* and *Codula* in regard to several of its characters. The spine at the apex of the antennæ is minute as in *Codula,* not large as in *Opseostlengis,* and the abdomen has seven visible segments as on *Opseostlengis,* whereas *Codula* has six. Most of the smaller forms have the abdomen widening from the base to the apex of the fourth segment; in *Opseostlengis* it widens to the apex of the fifth. However, one species, *C. mulleri,* narrows from the base to the apex of the second segment (which is a

character of *Brachyrrhopala*), after which it widens out, but on the male of *C. mulleri* it becomes practically parallel from this point. It is not at all certain if the coalescence of M_1 and R_5 near the wing margin will be maintained entirely in the venation, but in the event of this failing the large size of the three species classed as having the character will readily group those forms. *C. crabroniformis* and *C. splendidissima* have been regarded by several entomologists as mimic forms of certain large wasps.

Key to the species of Chrysopogon.

1. Wings with M_1 and R_5 coalescing near the wing margin. Very large black and yellow species .. .. 2.

   Wings with M_1 and R_5 separated at the wing margin. Abdomen widening from the base to the apex of the fourth segment. Medium and small sized species .. .. 4.

2. Abdomen narrowing from the base to the apex of the second segment, more or less widening from thence to the apex of the fourth segment. Moustache with one row of bristly hairs .. .. .. *mulleri* Roder.

   Abdomen widening from the base to the apex of the third segment. Moustache composed of one row of bristly hairs, rarely with hair above these .. .. 3.

3. Abdomen with segments 3 and 4 entirely black .. *crabroniformis* Roder.

   Abdomen with the third segment only partly marked with black, and the fourth above without black or almost so .. .. *splendidissimus* Ricardo.

4. Moustache bushy along the oral margin. Abdomen with the first, base of second, third, and base of fourth segments black; elsewhere yellow .. .. *albopunctatus* Macquart.

   Moustache confined to one row of hair .. .. 5.

5. Abdomen banded with gold at the apex of the first to fifth segments, the base of the sixth also golden *fasciatus* Ricardo.

   Abdomen never with gold .. .. 6.

6. Abdomen entirely black, except some silvery lateral spots and narrow bands at incisions of segments may be present. Legs entirely black .. .. *punctatus* Ricardo.

   Abdomen never entirely black, or if so the legs are of a lighter colour .. .. 7.

7. Abdomen with a large part of the dorsal surface black, but laterally, the apex of the fifth, the whole of the following segments, and the whole abdominal area below is reddish brown .. .. 8.

   Abdomen largely black, but usually from the second to sixth segments are reddish brown at apex; if the abdomen becomes entirely black, the reddish brown legs will distinguish the species .. .. *queenslandi* Ricardo.

8. Legs reddish brown .. .. *rufulus* White.
   Legs entirely black .. .. *nigricans* White.

Chrysopogon mulleri Roder.

Roder 1892, 243; Ricardo 1912, 483.

This species was described from Victoria, from which State specimens were seen by me some years ago. The specimens now before me were kindly lent by Mr. A. J. Nicholson, who took them in New South Wales; the male is from Capertee, and the female from Ilford, both dated 29th December, 1923. There is often a strong tendency for the abdomen to become greasy and the colour markings thus obscured.

Chrysopogon crabroniformis Roder.

Roder 1881, 213; Ricardo 1912, 483; Nicholson 1927, p. 47, Pl. ii., fig. 3.

This common Queensland species is apparently confined to inland districts. Those dated indicate the month of February is the time of their occurrence on the wing.

Chrysopogon splendidissimus Ricardo.

Ricardo 1912, 485.

Originally this was described as from Western Australia, so the form would appear to have a very wide range. Specimens before me are from Albury, New South Wales, 6-1-29 (F. E. Wilson), and Chinchilla, Queensland (A. P. Dodd), both being females.

Chrysopogon albopunctatus Macquart.

Dasypogon albopunctatus Macquart 1846, 193; Walker 1854, 578.
Laparus albopunctatus Schiner 1867, 369.
Neolaparus albopunctatus Kertesz 1909, 119.
Chrysopogon albopunctatus Ricardo 1912, 482; Dakin and Fordham 1922, 524.
Dasypogon spinther Walker 1849, 337; 1854, 478.

This was described by Macquart as from New South Wales, but it seems to be known only from Western Australia, where it is common and widely distributed. One specimen before me has a small species of *Apiocera* as prey.

Chrysopogon punctatus Ricardo.

Ricardo 1912, 484.

A pair in Mr. J. Mann's collection, captured in Brisbane during the months of December and January, are the only specimens I have seen. There is no mistaking this all-black form, which is not known outside Queensland. A female from Goondiwindi is allied, but has abundant hair above the moustache (December 1927, G. R. Bassingthwaighte).

Chrysopogon fasciatus Ricardo.

Ricardo 1912, 483; ??*Chrpsopogon sp.* near *fasciatus* Nicholson 1927, Pl. 1, fig. 21.

There are two species known to me that have the abdomen conspicuously marked with gold; in one the gold bands are interrupted; in the present case they are continuous across the abdomen. One female, Bunya Mountains, 3,000 ft., 9-1-26 (Dr. A. J. Turner).

Chrysopogon rufulus White.

White 1914, 268.

Five male specimens are before me, all from Perth, Western Australia; one of these is the type which White recorded as being a female, but he was misled by some foreign substance which adhered to the hypopygium and is now removed, showing the true nature of that organ.

Chrysopogon nigricans White.

White 1914, 268.

Two specimens, both females, are before me. White had access to these and the five *C. rufulus* referred to above, but he made no reference to other than the holotypes. The two forms are closely allied and the sexes are consistent in each case, thus suggesting they may be but the sexes of one dimorphic species, especially as all are from Perth, Western Australia.

Chrysopogon queenslandi Ricardo.

Ricardo 1912, 484.

There are two specimens in Mr. J. Mann's collection from Kuranda, December 1927 (A. P. Dodd), and a darker specimen in my own collection from Coen River (W. D. Dodd). Specimens originally described were also from Queensland, but Ricardo also reported a specimen from Western Australia which she considered to be the same species.

Chrysopogon pallidipennis White.

White 1918, 72.

The unique type was described from Sydney, New South Wales, and according to its published characters it would run out in the above key to *C. queenslandi*. White gives the colours as yellow, and there is a specimen before me from Southern Queensland that approximates White's description, this having yellow margins on the fifth and sixth abdominal segments, but the legs are coloured as in *C. queenslandi*, missing only the fuscous stains on the femora. It is possible that White described a pale specimen of *C. queenslandi*, and that the one before me is an intermediate variety. There is a still brighter form from Cairns, represented by five specimens in Mr. J. Mann's collection.

Chrysopogon rubripennis White.

White 1918, 73.

Not seen by me and was described from a unique Victorian specimen; it should be easily recognised by the claret-red thorax.

Genus OPSEOSTLENGIS White.

White 1914, 269; Hardy 1921, 288.

I have already given the generic characters of this genus, but attention must be drawn to the moustache which White states arises from the middle of the face; it is situated on the oral margin as in *Chrysopogon*, &c.

Opseostlengis insignis White.

White 1916, 269.

The unique type is a male, not female as White states; it is difficult to understand how this error arose, considering the claspers are clearly defined.

OBSERVATIONS OF SOME HABITS OF AND MIMICRY AMONGST ROBBER-FLIES.

These notes do not aim at crediting or discrediting any views expressed in favour of or against the theory of mimicry as far as it affects robber-flies. They reflect upon some aspects of the case that rather support the idea that mimicry may occur in the family in contradistinction to the views Melin (1923) expressed, which views uncompromisingly denounce the principles from several aspects. On reading Melin's remarks about robber-flies, one is rather strongly led to the view that these insects are robust and active enough to escape danger without having to resort to deceptive measures for their own protection. But this is not invariably the case, for I have caught many specimens, especially species of *Cerdistus,* by placing a tube over them whilst they were resting between their intermittent periods of hawking. A still weaker type is represented by species of *Leptogaster* which would appear to have very little protection against any insectivorous bird that might come their way, whilst the slow flight and the wary nature of their movements preclude them becoming seriously tangled in spiders' webs.

Where other invertebrates are concerned, robber-flies are the most skilled of their kind. I have not seen one preyed upon in Australia; on the other hand predaceans of most kinds succumb to them, including dragon-flies and spiders. Nor have I seen birds attempt to catch them, though I have watched birds pounce upon Bombyliidæ on the wing, these flies being more active in flight. Nevertheless there is one record of a bird eating a robber-fly, and several cases of insects, such as Mantis, bees, and wasps, that have gained the mastery when robber-flies have attacked them, these being noted in other countries. Many would seem to be caught in spiders' webs, but in Australia, although I have seen many arrested in this manner, they invariably break free again, if indeed they do not break right through in their headlong flight.

Nicholson (1927) has drawn attention to resemblances between certain robber-flies and wasps, but his work treats only with the principles of mimicry, and does not incorporate data of consequence to support the view that mimicry amongst robber-flies is indisputable.

There are, of course, varying degrees in mimicry, and no robber-fly seen by me in the field has had the perfection reached by certain Syrphidæ, especially *Cerioides subarmata,* which is well-nigh indistinguishable from a wasp in colouration, shape, and deportment, and moreover has advanced so far along this line as to fold its wings longitudinally as an Eumenid wasp, for which it is readily mistaken.

There would be no reason to doubt the occurrence of mimicry amongst robber-flies if such a case should be found where a mimic and its model were to be found to have identical colouration and deportment, so the question arises as to how far mimicry amongst robber-flies has gone, if at all.

A reasonable chance of attaining information is to ascertain if the mimic forms have adapted habits away from the normal of the family, tribe, or genus to which they belong, and if by so doing they have reasonably added to their chance of survival. It is to indicate possibilities along this line that the present note is written, and there is no intention to show here that mimicry is resorted to for the protective measures it may yield.

The genus *Leptogaster* is mainly found hunting and resting amongst grasses and reeds, not infrequently also around dead twigs on trees, especially in fairly dense bush where grassy undergrowth is not abundant. These flies rest on grass-stems and twigs alike, with their bodies held horizontally, and, when going into a state of coma, all their tarsi are bunched to grip their support immediately adjacent to the face. On twigs they invariably take up their position at the tip of the twig, becoming in this manner a continuation of the twig, having the appearance in this case of assuming a protective attitude of mimicry. On grasses and reeds no such state of mimicry can be expected, and, on the two or three times I have found them there in the state of coma, their colours did not particularly become absorbed by their surroundings.

The *Saropogonini* are all ground-frequenting at the time of oviposition. Many of them seem to be entirely ground-frequenting; in a few cases the male frequents flowers, rarely so the female, whilst in one case, *Erethropogon,* the species is abundant at flowers, and both sexes are to be taken in numbers there.

Erethropogon limbipennis is one of the mimic forms mentioned by Nicholson, and on account of its somewhat unusual habits is deserving of deeper study, both in structure and behaviour. So far, unlike the habits of other flower-frequenters, I have never seen the species with prey. Nicholson refers to its wasp-like nature as being not unlike *Polistes,* but from my own experience I have found in its general activities it resembles the Cerambycid beetle *Hesthesis ? cingulata* with which it occurs. One would never suspect any real resemblance by comparing specimens side by side, so the similarity depends entirely upon their actions. It is possible that these insects have a common model that was missing during my observations.

Two or three species of *Saropogon* also frequent flowers, and, like *Erythropogon limbipennis,* face the flowers, whereas *Thereutria* and other flower-frequenters seem to alight upon flowering shrubs and take up the attitude of awaiting prey, facing away from the flowers. *Sarapogon spp.* are not infrequently taken with prey, whilst *Thereutria* is a persistent hawker, taking restless intermittent flights.

Another species of this tribe was mentioned amongst mimics by Nicholson, namely *Neosaropogon princeps,* a rather large yellow and black form with a somewhat clubbed abdomen, more especially clubbed on the female. It seems to be entirely ground and low-shrub frequenting, and were it not for the fact that the abdomen is clubbed there would be no real resemblance to the Hymenoptera. In all probability the name covers a complex of species in collections, and therefore general remarks may not have any particular specific significance. I have had no difficulty in recognising its nature in the field; it was recognised as an Asilid because it acted like an Asilid, not like a wasp.

The *Phellini* apparently, and the *Laphrini* definitely, are mainly tree-frequenters; the *Atomosini* are ground-frequenting, and as far as I have met with them they are entirely confined to the bush, where *Cryptopogon* also occurs; the latter belongs to a tribe that is as yet unnamed, but another genus belonging to it, *Clinopogon,* contains a species that frequents sand-dunes on the coast, and its colour tones into its surroundings in a remarkably unnoticeable way, sharing in this feature the peculiarity of *Tabanus vetustus* Walker, *Platycarenum quinquevittata* Macquart, and certain other Diptera that also occur on coastal sand-dunes.

The *Brachyrrhopalini* have mixed habits, but owing to their general scarcity any definite information is not easy to acquire. *Codula* is said to frequent tree-trunks, and *Brachyrrhopala* is not uncommonly seen on shrubs, in one case on telegraph poles; one specimen in a state of coma was found on the upper side of a leaf of a persimmon tree, looking very like a Syrphid fly, nevertheless it was not wasp-like. In activity and habits they cannot be taken for anything but a robber-fly. The new species described above, *B. semirufa,* is superficially like the *Conops sp.* illustrated by Nicholson on Plate 1, fig. 9; the brightness of the red, when living, being as there given, thus bringing this species well within those types regarded as mimic forms. The genus *Chrysopogon* is recorded as ground-frequenting, but it is not certain if this habit is uniformly found throughout the genus. Nicholson remarks that *Chrysopogon crabroniformis* appears to have habits identical with *Neosaropogon princeps*; as the two species belong to different tribes, this observation may be very significant. Details of habits are wanted for the species, as several entomologists have drawn attention to its wasp-like nature in the field, and like *Erethropogon* it seems to have habits rather unusual for its type.

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